UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TENNESSEE
AT KNOXVILLE

GREGORY M. QUILLIN and wife, HELEN QUILLIN,	)	
Plaintiffs,	)	
v.	)	No. 3:03-CV-151 (VARLAN/SHIRLEY)
EASTON SPORTS, INC. and CHUMBOLLY, INC. d/b/a THE BIKE ZOO,	)	
Defendants.	)	

MEMORANDUM & ORDER

This case is before the undersigned pursuant to 28 U.S.C. § 636(b), the Rules of this Court, and by Order [Doc. 114] of the Honorable Thomas A. Varlan, United States District Judge, for disposition of Defendant Chumbolly, Inc.'s Motion in Limine and Motion to Strike, or Alternatively, Motion for a Daubert Hearing Regarding the Testimony of the Proposed Expert Witness of Defendant, Easton Sports, Inc. [Doc. 93].

I. BACKGROUND

This lawsuit arises from a bicycle accident which occurred on April 29, 2002 while the plaintiff Gregory M. Quillin was riding on a mountain trail in Anderson County, Tennessee. The plaintiff claims that the handlebar suddenly snapped, causing him to fall and to incur serious injuries. [Doc. 1]. The subject handlebar was a carbon fiber handlebar manufactured by the defendant Easton Sports, Inc. ("Easton"). The handlebar was connected to the bicycle by a handlebar stem

manufactured by L.H. Thomson Company.[1] The defendant Chumbolly, Inc. d/b/a The Bike Zoo ("Bike Zoo") installed the Thomson stem on the plaintiff's bicycle.

II. APPLICABLE LAW: ADMISSIBILITY OF EXPERT TESTIMONY

Bike Zoo has filed a motion challenging the qualifications and/or opinions of Easton's expert, Michael Stevenson, Ph.D., under Rule 702 of the Federal Rules of Evidence and Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993). Rule 702 of the Federal Rules of Evidence governs the admissibility of expert testimony:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

The trial judge must act as a gatekeeper, admitting only that expert testimony that is relevant and reliable. Daubert, 509 U.S. at 589. With regard to scientific knowledge, the trial court must initially determine whether the reasoning or methodology used is scientifically valid and is properly applied to the facts at issue in the trial. Id. To aid the trial court in this gatekeeping role, the Supreme Court has listed several key considerations: (1) whether the scientific knowledge can or has been tested; (2) whether the given theory or technique has been published or been the subject of peer review; (3) whether a known error rate exists; and (4) whether the theory enjoys general acceptance in the particular field. Id. at 592-94. The Court's focus "must be solely on principles and methodology,

[1]L.H. Thomson Company was originally a defendant in this matter but was granted summary judgment on June 17, 2005. [Doc. 80].

not on the conclusions that they generate." Id. at 595. "[T]he test under Daubert is not the correctness of the expert's conclusions but the soundness of his methodology." Daubert v. Merrell Dow Pharmaceuticals, Inc., 43 F.3d 1311 (9th Cir. 1995).

Although Daubert centered around the admissibility of scientific expert opinions, the trial court's gatekeeping function applies to all expert testimony, including that based upon specialized or technical, as opposed to scientific, knowledge. Kumho Tire Co. v. Carmichael, 526 U.S. 137, 147-48 (1999); Berry v. City of Detroit, 25 F.3d 1342, 1350 (6th Cir. 1994). The trial court's objective "is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." Kumho Tire, 526 U.S. at 152. The trial judge enjoys broad discretion in determining whether the factors listed in Daubert reasonably measure reliability in a given case. Id. at 153. With this framework in mind, the Court will now address Bike Zoo's motion.

III. DR. MICHAEL STEVENSON

Bike Zoo moves to exclude Easton's expert witness, Michael E. Stevenson, Ph.D. from testifying as to his opinions set forth in his preliminary report dated April 15, 2005 and in his deposition taken on June 16, 2005. [Doc. 93]. Specifically, Bike Zoo seeks to preclude Dr. Stevenson from testifying to his opinion that

> the loose connection between the stem and handlebar, as evidenced by the undertorqued bolts and the non-uniform gap, when combined with a dynamic event such as landing, was the cause of the handlebar fracture in this case.

[Doc. 73, Stevenson Aff. ¶ 8]. For grounds, Bike Zoo argues that Dr. Stevenson's opinions are not based on sufficient facts or data nor based on any reliable principles or methods because: (1) the torque on the stem bolts measured two years after installation is not a reliable basis for Dr. Stevenson's opinion; (2) the concentric partial ring markings underneath the stem clamp do not indicate a loose connection between the handlebar and the stem; (3) the uneven gap between the handlebar and the stem is not indicative of a loose connection between the stem and the handlebar; and (4) that there was no single event that caused stress on the handlebar. Bike Zoo further argues that Dr. Stevenson does not have the experience in carbon and carbon fiber composites to testify as an expert in this case. [Doc. 94].

Easton opposes Bike Zoo's motion, arguing that Dr. Stevenson's opinions are soundly based upon scientific principles and his detailed testing and examination of the handlebar at issue. Easton further argues that the affidavit of Bike Zoo's expert, Dr. John Fellers, in which he sets forth his disagreements with Dr. Stevenson's opinions, does not establish that the bases for those opinions are unreliable. Finally, Easton argues that Dr. Stevenson is unquestionably qualified and competent to render expert opinions on the failure of the subject handlebar in this case. [Doc. 99].

A. Qualifications

The Court begins its analysis by examining Dr. Stevenson's qualifications to render expert opinions in this case. A witness may be qualified to testify as an expert based on the witness' "knowledge, skill, experience, training, or education." See Fed. R. Evid. 702. Bike Zoo argues that Dr. Stevenson's curriculum vitae demonstrates that he has no work experience with polymers; that he has not prepared any reports or scientific publications regarding polymers or polymer based

composites; and that he has not had any experience with any of the polymers used in the Easton handlebar.

Easton responds that Dr. Stevenson's C.V. contains ample evidence of his qualifications in the areas of material sciences, fracture mechanics, and failure analysis. Easton further argues that Dr. Stevenson has published extensively in the academic field of materials science, including several articles regarding composites and polymers, and that he has in-depth expertise in the areas of contact and impact mechanics.

Based upon a review of Dr. Stevenson's curriculum vitae, his affidavit, and his testimony in this case, the Court finds that Dr. Stevenson has the requisite knowledge, skill, experience, training and education as required by Rule 702 to testify as an expert regarding the failure of the subject carbon fiber composite handlebar. Dr. Stevenson holds B.S. and M.S. degrees in Metallurgical and Materials Engineering, as well as a Ph.D. in Metallurgical Engineering from the University of Alabama. He has taught material science courses at the University of Alabama in Engineering Materials and in Mechanical Behavior of Materials, and has given numerous presentations, seminars, and lectures on the subjects of metallurgical failure analysis, composite materials, and carbon composite materials. Dr. Stevenson has also published extensively in the field of materials science, including several articles focusing on composites and polymers, as well as the subject of failure analysis. He is the Associate Editor of Practical Failure Analysis/Journal of Failure Analysis and Prevention, and is a member of the Editorial Review Board of the Journal of Materials Engineering and Performance, which are both scholarly scientific publications. Additionally, Dr. Stevenson is active in the American Society for Testing and Materials ("ASTM") and was the primary author of ASTM E2332-04, which sets forth the standard practice in the field

of engineering for the investigation and analysis of physical component failures. Dr. Stevenson's C.V. also shows that he has experience in the areas of contact and impact mechanics, and that he has issued technical reports for private publication on the issues of bolt performance and bolted connections. For these reasons, the Court finds that Dr. Stevenson is qualified to render expert opinions in this case regarding the failure of the subject handlebar.

B. Reliability of Opinions

Having determined that Dr. Stevenson is qualified to render expert opinions, the Court must next determine whether the reasoning or methodology used by Dr. Stevenson was scientifically valid and was properly applied to the facts at issue. See Daubert, 509 U.S. at 589.

In his report dated April 15, 2005, Dr. Stevenson sets forth the bases for his opinions. Dr. Stevenson states that he reviewed numerous documents pertaining to this action, including reports and opinions generated by other investigators, as well as pertinent pleadings filed by the parties (including the complaints, answers, and summary judgment motions and responses); the party depositions taken prior to April, 2005; photographs and data collected by Bike Zoo's expert, Dr. John Fellers, pertaining to measurements of the subject handlebar and stem; miscellaneous photographs of the subject stem and handlebar assembly; various technical bulletins published by Easton; handlebar stem assembly instructions; and an "Elite Stem" size diagram. Additionally, Dr. Stevenson states that he reviewed four scientific articles in preparing his report. Further, Dr. Stevenson states that he conducted (1) visual and light microscopic examination of the subject handlebar and stem; (2) dimensional evaluation of the subject handlebar and stem, as well as exemplar handlebars and stems; (3) mechanical testing of exemplar handlebars and stem; and (4) engineering mechanics analyses of the handlebar-stem assembly. Dr. Stevenson states that he also

bases his opinions on his education and experience as an engineer, and particularly, his experience in conducting materials and mechanical failure analyses. [Stevenson Report, Apr. 15, 2005, at 4-6]. Dr. Stevenson's testing was performed pursuant to ASTM E2332-04, which governs the standard practice for investigation and analysis of physical component failures. [Stevenson Aff. ¶ 5; Stevenson Testimony, Feb. 23, 2006 at 120-21].

Based upon his visual and light microscopic examination of the subject stem and handlebar, Dr. Stevenson opines that the "[f]ailure of the composite handlebar occurred by a single event overload fracture mechanism." He states in his report that the visual and light microscopic examination revealed a fracture morphology consistent with bending overload of composite structures. He states that there were not any signs of fatigue fracture or fracture initiation points associated with environmental degradation. [Stevenson Report at 6 ¶ 1]. Dr. Stevenson did not observe any material imperfections in his visual and light microscopic examination that would have degraded the handlebar's strength under static or dynamic loading conditions. [Id. at 8 ¶ 6].

Dr. Stevenson further opines, based upon his visual and light microscopic examination, that "[t]he handlebar fracture initiated at the bottom (with respect to the ground, when installed correctly) of the tube and propagated in a progressive manner to the top of the handlebar, resulting in a complete fracture." [Id. at 6 ¶ 2]. Dr. Stevenson states that the handlebar outer surface revealed a region of point contact and associated crushing near the bottom of the tube, which is consistent with the classical fractures patterns observed in composite tubular structures. [Id.].

Next, Dr. Stevenson opines that "[t]he presence of a point loaded condition resulted in a stress concentration at the location of fracture in the subject handlebar," and that "[t]he change in stress distribution imparted by a point load configuration is consistent with the physical

appearance of the fractured handlebar." [Id. at 6 ¶ 3]. Dr. Stevenson states the basis for this opinion as follows:

> Basis: An engineering mechanics evaluation of both a distributed load case and a point loaded case for the handlebar-stem connection was performed. The distributed load case corresponds to a condition where full clamping force on the handlebar is achieved by the stem. Applied forces, such as those transmitted to the handlebar when landing from a jump or from an external impact, are distributed over the contact area between the stem and the handlebar. For the point loaded case, the transmitted forces become localized at the edge of the stem, resulting in an approximate static stress concentration factor greater than 4. The zone of localized crushing observed at the fracture initiation point under visual and microscopic examination is consistent with the zone of stress concentration for point loading simulated by finite element analysis....

[Id. at 6-7 ¶ 3].

Next, Dr. Stevenson opines that "[t]he presence of a stress concentration in conjunction with the reduced clamping force imparted by a loose connection reduces the overall strength of the handlebar under static and dynamic loading conditions." Dr. Stevenson notes that the effect is more pronounced under dynamic loading conditions. Dr. Stevenson bases this opinion on his mechanical testing of two exemplar handlebar-stem assemblies, one in the properly torqued and gapped configuration and the second in a condition that simulates the gaps measured by Dr. Fellers on the subject connection. This testing indicated that the required force and total strain energy required to cause local crushing damage to an Easton EC-70 handlebar was lower for the case of a loose mechanical connection, and "that the onset of a point loading configuration reduces the strength of the tube." [Id. at 7 ¶ 4].

Dr. Stevenson further opines that "[t]he presence of a point loaded configuration in the handlebar-stem connection requires that the connection be loose." Dr. Stevenson notes that if

the stem clamping mechanism is installed with uniform torque, there is a uniform load distribution over the internal bearing surface of the stem, prohibiting the establishment of point loads. [Id. at 7 ¶ 5].

Next, Dr. Stevenson opines that the subject handlebar-stem connection "was loose at the time of, and prior to, the mechanical event which caused the handlebar to fracture." Dr. Stevenson bases this opinion on his evaluation of the dimensional measurements taken by Bike Zoo's expert, Dr. Fellers, which revealed that the bolt torque on two of the four stem bolts was significantly less than the 48 in-lbf prescribed by the stem manufacturer, and Dr. Fellers' measurement of the stem gap, which ranged from 0.042 inches to 0.063 inches, contrary to the stem manufacturer's specification of a uniform gap of 0.029 inches around the stem. Dr. Stevenson opines that this increase in clearance facilitated movement of the handlebar, allowing for point loading at the edge of the stem. Dr. Stevenson also bases this opinion upon his visual examination of the region of the handlebar that was encapsulated by the stem. He notes that this area shows evidence of "relative motion and sliding contact, a condition that requires a loose connection." [Id. at 8 ¶ 7].

Dr. Stevenson further states his opinion that the handlebar's failure "was not facilitated by the presence of a design or manufacturing defect in the handlebar." Dr. Stevenson bases this opinion on both his mechanical testing and engineering mechanics evaluations of the handlebar and handlebar-stem connection, as well as his visual and light microscopic examination, which he states did not reveal any fracture initiation point associated with material inhomogeneities or other imperfections relating to the manufacturing process. Based upon his testing and evaluation, he opines that if the handlebar is installed to the specifications published by the stem manufacturer,

"the handlebars possess sufficient strength to withstand dynamic forces equal to the mass of a rider at several times gravitational acceleration." [Id. at 8 ¶ 8].

Finally, Dr. Stevenson opines that the "[f]ailure of the handlebar was facilitated by a loose mechanical connection between the stem and handlebar, resulting from inadequate assembly of the connection and inadequate torquing of the stem bolts." Dr. Stevenson summarizes the basis for this opinion as follows:

> Basis: The handlebar failure initiated at a region of crushing that resulted from a point loaded configuration. This crushing damage was facilitated by severe stress concentrations associated with point loading. A point loaded configuration for the handlebar-stem connection can only become operative under loose connection conditions; these conditions were verified by the physical measurements of the subject handlebar (made by Dr. John Fellers) and the physical condition of the handlebar as observed by visual and light microscopic examination. No other contributing factors, such as fatigue damage, environmental degradation, manufacturing imperfections, or design deficiencies were observed....

[Id. at 9 ¶ 9].

1. Torque Measurements

Bike Zoo first argues that Dr. Stevenson's opinions are not admissible because the torque on the stem bolts measured two years after installation is not a reliable basis for his opinion.[2] In support of this argument, Bike Zoo that Dr. Stevenson admitted in his deposition (1) that his theory that the handlebar was loose in the stem could not be based solely on the torque measurements of the stem bolts; (2) that the bolts could loosen over time; and (3) that the accident which is the subject of this lawsuit could have lowered the torque values. Bike Zoo further relies

[2]The Court notes that this is an interesting argument, in light of the fact that it was Bike Zoo's own expert who took the torque measurements that Bike Zoo now claims are not a reliable basis for an expert opinion.

on the affidavit of its expert, Dr. Fellers, in which he opines that the torque measurements were not too low; that the handlebar did not move in the stem; and that torque measurements taken two years after the accident would not be the same torque that was used by Bike Zoo at the time of installation.

Dr. Stevenson made it clear in his deposition that Dr. Fellers' torque measurements taken over two years after the accident were not the only basis for his opinion that the stem bolts were not properly torqued at the time of installation. Specifically, Dr. Stevenson testified in his deposition that the torque measurements were merely "one part, one component as data that I used as part of my analysis." [Stevenson Dep. at 49]. In addition to the torque measurements, Dr. Stevenson also relied upon evidence of oscillatory wear on the handlebar, which he testified indicated an insufficient clamping force and therefore insufficient torque of the stem bolts, as well as the uneven stem gap. [Id. at 31].

Dr. Stevenson acknowledged in his deposition that stem bolts could loosen over time [Id. at 43]. However, he testified that if the initial clamping force on the bolted connection was insufficient to maintain itself, then a shock load, in conjunction with vibrations, could cause the bolts to back out or loosen. [Id.]. He later emphasized that the vibrations and shocks he was referring to were forces generated by landing and riding, which this bicycle was not subjected to after the accident. [Id. at 75]. Dr. Stevenson also emphasized during the Daubert hearing that a shock alone, without any vibrations, would not be sufficient to cause the stem bolts to loosen. [Steven Testimony, Feb. 23, 2006 at 63]. Dr. Stevenson based this opinion on the scientific literature that he has reviewed. [Id.]. Because the accident involved only a shock and would not have produced the required vibrations under load, Dr. Stevenson opined that the accident itself would not have caused the bolts to loosen. Morevoer, Dr. Stevenson found no evidence that the stem-handlebar assembly

was placed in an environment with vibrations or oscillations after the accident such that the stem bolts would have backed out or loosened. [Id. at 46-47, 112-13].

Dr. Stevenson also acknowledged during the Daubert hearing that thermal changes could, under some conditions, cause a loosening of the bolted joint. However, he stated that he had performed testing that ruled out that thermal changes within typical seasonal variances would affect this particular bolted connection. [Id. at 35].

Dr. Stevenson's opinion regarding the undertorquing of the stem bolts is clearly based on more evidence than just Dr. Fellers' torque measurements. Accordingly, Bike Zoo's argument that his opinion is unreliable on this ground is without merit.

2. Oscillatory Wear

Next, Bike Zoo argues that Dr. Stevenson is mistaken in his interpretation of certain markings on the handlebar, which Dr. Stevenson has opined indicates a loose connection between the handlebar and stem. For grounds, Bike Zoo argues that Dr. Stevenson admitted in his deposition that these markings could have been made by the previous stem that had been used with this handlebar for approximately a year and a half and not the Thomson stem that was installed just three weeks before the accident. [Stevenson Dep. at 98]. Furthermore, Bike Zoo argues that Dr. Stevenson's opinions are in contradiction with the opinions of Bike Zoo's expert Dr. Fellers, who opines that the markings are in fact the result of machine markings on the inside of the aluminum Thomson stem which were imprinted on the handlebar when the two were clamped together. Dr. Fellers explains in his affidavit that the markings are only partial rings because of the uneven dimensions of the diameter of the handlebar in this area. Dr. Fellers further notes that there are no "snake bite" markings, which would indicate that the torque on the stem bolts was too high, nor was

the handlebar's Easton logo smeared, which would indicate that the torque was too low. [Fellers Aff. ¶ 8].

As the Court discussed earlier in this opinion, Dr. Stevenson's opinion that the torque on the stem bolts was too low was based on Dr. Fellers' torque measurements and his own observation of physical markings on the handlebar indicating oscillatory wear. While Dr. Stevenson does state in his deposition that such markings were possibly caused by the previous stem, he later clarified that statement as follows:

> Q. Let me ask you to assume that this handlebar was first installed in September of 2001 on the stem that originally came on the bike, not the Thomson stem, and that from September 4th of 2001 through April the 5th of 2002 Mr. Quillin rode the bike 47 times. Could that period of time have caused the damage that you observed to this handlebar?
>
> A. If the interior contact surface and the contact pattern between the stem – that stem and the handlebar were the exact same and the internal surface character were the exact same as the Thomson stem and that connection were loose, that would be a possibility.
>
> Q. And you don't know whether that happened or not?
>
> A. I do not.
>
> * * *
>
> Q. Is it possible that the damage you have said you observed in these photographs could have occurred in the 24 days between April 5th 2002, and April 29th of 2002, when he had only ridden the bicycle five times?
>
> A. Yes.
>
> Q. All of the damage you observed?
>
> A. Yes. It's – yes.
>
> Q. Okay. Can you possibly know that without looking at the other stem?

A. Do I know it to an absolute fact? I mean, you asked me if it was possible in that time period under riding to have that kind of wear. My answer is yes.

Q. Okay. Are you saying that anything's possible? Is it probable that it happened in that time?

A. I would say – I would say if the connection is loose, that is very likely. It's very much consistent with that. The aluminum material is going to be harder than the paint that's going to be worn off so that kind of wear process makes good fundamental engineering sense.

Q. But you can't say without looking at the other stem whether it did or not?

A. For the reasons I qualified, I think, three questions ago, yes. There's – *I don't consider it probable because the wear patterns match up exactly to the dimensions and markings on the Thomson stem so if the other stem were exactly the same, had the exact same surface finish, that would be a possibility, but I would consider it relatively remote.*

[Stevenson Dep. at 98-100] (emphasis added).

Dr. Stevenson further described the oscillatory wear he observed as follows:

Q. Okay. This observation you've testified about of oscillatory wear pattern, was that done by microscope or done by naked eye?

A. Both.

Q. Okay. Do you have pictures of them in this report?

A. I do.

Q. Okay.

A. The two specific exhibits that I'm referring to as Exhibits 19 and 20. These were done at low magnification of both side of the handlebar, and the oscillatory wear pattern is evident in the areas where the paint has been removed. You can see evidence of sliding contact on the surfaces in both cases.

* * *

Q. Okay. What would you expect to see here if there hadn't been this oscillating pattern that you describe?

A. I would expect to see all – more of or all of the original painted logos to be intact.

Q. Okay. So there should be no marks even though a clamp had been on there?

A. I – I didn't say no marks. There should be no evidence of oscillatory wear. There may be scrapes from installation. Those would be in a different orientation. There may be dirt, for example, but I wouldn't expect rubbing-type wear, oscillatory back-and-forth-type wear patterns.

* * *

Q. Okay. Have you ruled out any other thing that could have caused the scraping off of the surface of that handlebar?

A. I will say that I have not identified any other mechanisms by which that could occur.

* * *

Q. So it's your testimony that there's no other way the coating of this could have been scraped off except for an oscillatory wear pattern?

A. No other way that it could have been scraped off, to use your term, in this manner, in this pattern.

[Id. at 50-53]. Dr. Stevenson further testified in the Daubert hearing that the "smearing" or transfer of the painted logo on the handlebar was part of the same pattern that imprinted with the machine markings of the Thomson stem, which indicated that the wear occurred while the handlebar was installed in the Thomson stem. [Stevenson Testimony Feb. 23, 2006 at 103-04].

The Court finds that Dr. Stevenson has articulated a reliable scientific basis for his opinions regarding oscillatory wear and its correlation to a loose connection between the handlebar and stem. Dr. Stevenson stated in both his report and his deposition that he observed the oscillatory wear pattern both by a visual examination and by a microscopic examination. Based upon these observations, in addition to Dr. Fellers' torque measurements, as well as his training, education, and experience, Dr. Stevenson concluded that the torque on the stem bolts was too low. The fact that Dr. Fellers might disagree with Dr. Stevenson's conclusion in this regard does not, in the Court's view, render the methods of principles used by Dr. Stevenson unreliable. Accordingly, the Court will not conclude Dr. Stevenson's opinion on this basis.

3. Uneven Stem Gap

Dr. Stevenson also based his opinion that there was a loose connection between the handlebar and stem on the fact that there was an uneven stem gap, as measured by Dr. Fellers. Bike Zoo argues that the uneven stem gap is not a reliable basis for Dr. Stevenson' opinion that the handlebar fracture resulted from point loading which was caused by a loose connection between the stem and handlebar. For grounds, Bike Zoo cites the affidavit of Dr. Fellers, in which Dr. Fellers points out that Dr. Stevenson has ignored the significance of the out-of-roundness of the handlebar, which in Dr. Fellers' opinion, caused uneven stress distribution and the point loading. Dr. Fellers further opines that the handlebar precluded an even stress distribution regardless of the torque on the stem bolts. [Fellers Aff. ¶ 11].

Dr. Stevenson tested exemplar stems and handlebars, replicating the gap measurements noted by Dr. Fellers. In so doing, Dr. Stevenson found that the uneven stem gaps facilitated movement of the handlebar in the stem and allowed for point loading at the edge of the

stem. [Stevenson Report at 8 ¶ 7]. The mechanical testing on the exemplar handlebar-stem assembly that simulated the uneven stem gap measured by Dr. Fellers demonstrated "that the required force and total strain energy required to initiate local crushing damage . . . is lower for the case of a loose mechanical connection." [Id. at 7 ¶ 4].

With respect to Dr. Fellers' opinion that the handlebar was out of round, and that this out-of-roundness was the cause of the point loading, Dr. Stevenson testified that he considered this possibility in his analysis but ultimately rejected it because the out-of-roundness measured by Dr. Fellers was within the tolerances specified by Easton. In this regard, Dr. Stevenson testified as follows:

> Q. Paragraph six, second sentence [of Dr. Fellers' affidavit filed in support of The L.H. Thomson Company's Motion for Summary Judgment] "Whenever any" – I think he meant – "finely machined stem is applied to the Easton handlebar, uneven loading will present wherever the high places of the diameter meet the Thomson stem. Easton's failure to produce a handlebar which is absolutely consistent in diameter makes it handlebar more susceptible to failure." Agree or disagree?
>
> A. I don't agree with that statement, no. It's far too broad.
>
> Q. Why do you disagree with it besides it being too broad?
>
> A. Well, let's start with the fact that making a handlebar more susceptible to failure, and I'm assuming that he means in this system as applied to a stem, is not only a matter of the diameter and tolerances of the handlebar if it's plus or minus a few thousandths but how that handlebar mates up to the stem so if it's in general a few thousandths under all the way around, the applied forces from the stem will make up and totally erase that.
>
> If it were an egg and completely oval, which Dr. Fellers' measurements don't indicate, that would perhaps – or that would result in unequal loading. Locally in any real system, there is going to be tolerances and there will be some microscopic uneven loads, but I didn't observe any unusual amount of wear. Based on my stress

> analysis that I've conducted and was discussing earlier, a small point or a small area with a very small variance wouldn't necessarily give rise to the same types of stress concentrations that you get when you have a loose connection.

[Stevenson Dep. at 77-78].

The Court finds that Dr. Stevenson has demonstrated that the uneven stem gap is a reliable scientific basis for his opinion regarding the loose connection. Based on his mechanical testing of exemplar stems and handlebar assemblies, Dr. Stevenson concluded that the uneven stem gap created a loose connection and caused point loading at the edge of the stem. Dr. Stevenson's deposition testimony shows that he considered Dr. Fellers' conclusion that the point loading was caused by the out-of-roundness of the handlebar, but he rejected that conclusion for the reasons stated in his deposition. In sum, the Court finds that Dr. Stevenson's analysis was based upon reliable methods and principles. The fact that Dr. Fellers and Dr. Stevenson disagree about the conclusions from such analysis does not render Dr. Stevenson's methods and principles any less reliable in the Court's view. The Court finds Bike Zoo's argument on this issue to be without merit.

4. Single Event

Dr. Stevenson testified that there needed to have been an impact or landing type event or other external impact on the handlebar to cause enough stress for the fracture to occur. [Stevenson Dep. at 23, 94-95]. Bike Zoo argues that there is no factual basis for such an assumption, and as such, his opinion is not admissible because it is not based on sufficient facts or data. In arguing that no factual basis exists, Bike Zoo points to the fact that Mr. Quillin testified that he was not jumping his bike at the time of the accident, and that there has been no testimony that the handlebar struck any object before the bike fell to the ground.

The Court finds that there is ample factual basis for Dr. Stevenson's opinion that a single dynamic event contributed to the fracture of the handlebar. Dr. Stevenson performed mechanical testing of two exemplar handlebar-stem assemblies (one in the properly torqued and gapped configuration and the other with gaps that simulated the gaps measured by Dr. Fellers), which indicated that the loose mechanical connection lowered the amount of force and total strain energy required to cause localized crushing and that the onset of crushing occurred more rapidly under dynamic conditions. [Stevenson Report at 7 ¶ 4]. The fact that Mr. Quillin denies that any such dynamic event occurred at the time of the accident does not necessarily negate the factual basis for Dr. Stevenson's opinion. The plaintiff and Bike Zoo are free to question Dr. Stevenson on cross-examination about Mr. Quillin's testimony. See Daubert, 509 U.S. at 596 ("Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence."). The fact that Mr. Quillin has testified in a manner contrary to Dr. Stevenson's test results, however, does not render Dr. Stevenson's opinion unreliable or otherwise warrant its exclusion.

III. CONCLUSION

The Court finds that Dr. Stevenson is qualified to render opinions in this case regarding the failure of the subject handlebar. The Court further finds that Dr. Stevenson has set forth reliable bases for his opinion that the loose connection between the stem and handlebar was the cause of the handlebar fracture in this case. Accordingly, Bike Zoo's Motion in Limine and

Motion to Strike, or Alternatively, Motion for a Daubert Hearing Regarding the Testimony of the Proposed Expert Witness of Defendant Easton Sports, Inc. [Doc. 93] is **DENIED**.

IT IS SO ORDERED.

ENTER:

s/ C. Clifford Shirley, Jr.
United States Magistrate Judge